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In re Applicant:	Brad D. Rumsey	§	Art Unit:	2827
Serial No.:	09/377,286	§		
Filed:	August 18, 1999	§	Examiner:	Kamand Cuneo
Title:	Positioning Flowable Solder For Bonding Integrated Circuit Elements	§	Docket No.	MCT.0050US (99-0325)

#14

Board of Patent Appeals & Interferences
Commissioner for Patents
Washington, DC 20231

REPLY BRIEF

Sir:

In response to the Examiner's Answer mailed on May 21, 2002, the Appellant hereby responds to the new issues raised by the Examiner.

REMARKS

The Appellant and the Examiner are at odds as to whether Healy et al. (hereinafter "Healy") disclose a structure that includes a trace that applies an attractive force to solder placed on a bond pad and a trace stub to counteract the attractive force or an element adapted to counteract the attractive force. Specifically, the Appellant submits that Healy's insulating material 2 covers the trace and the trace remnant so that an attractive force and counteractive attractive force do not arise. In contrast, the Examiner contends that there is a "void area"

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surrounding the solder bead 3 that extends beyond the interconnect pad 4 thereby resulting in the claimed limitations.

Healy expressly states that only the interconnect pad 4 is exposed. For example, referring to Figures 1 and 2, Healy states “a printed circuit trace 1 is supported by encasing insulation 2. The insulation has been removed from a portion of one side of the trace to expose the interconnect pad 4.” See Column 2, lines 18-21 (emphasis added). Healy does not state that the removed insulation exposes anything more than the interconnect pad 4. Moreover, Figures 1 and 2, taken together do not suggest otherwise. Figure 2 is a cross sectional view of the printed circuit trace and solder bead of Figure 1. The printed circuit trace of Figure 1 is a fragmentary view. See Column 2, lines 4-7. It is well understood that a fragmentary view includes a part that is broken away. See, fragment and fragmentary, WEBSTER’S NEW WORLD COMPACT DESK DICTIONARY, (1998). Thus, although the view of Figure 1 includes a broken away part, the structure contemplated by Healy does not, as evidenced by the cross-sectional views of Figures 2, 3 and 5. Accordingly, when considered as a whole, Healy teaches removing insulation material to expose only the interconnect pad 4. For this reason, Healy’s trace and trace remnant do not produce an attractive force or a counteractive attractive force respectively.

The Examiner correctly states that there is an area around the bead 3 that is void of insulating material 2, which renders that area exposed. For example, referring to Figures 1-4, Healy shows the bead 3 centered on the pad 4 so that the edge of the bead 3 lies within the perimeter of the pad 4. Healy states that the insulation is removed to expose the pad 4. Thus, there is a void area around the bead that renders a portion of the pad 4 exposed. In other words, that portion of the pad 4 that extends between the edge of the solder bead 3 and the edge of the insulation material is void of insulating material to render that area exposed. Because the

insulation material only exposes the pad 4, the void area does not extend beyond the perimeter of the pad. Accordingly, Healy's trace and trace remnant do not exert the required forces.

Similarly, Figure 4 does not show "exposed portions". For example, Figure 4 is an exploded perspective view and Figure 5 is a cross sectional view of similar assemblies. See Column 2, line 72 through Column 3, line 1. The embodiments shown in Figures 4 and 5 of Healy are heated to melt the solder beads so that the solder, through capillary action, "climbs between each conductive spacer 8 and the pin 7 to make a good electrical and mechanical connection", which assures a bond between the parallel surfaces. See Column 3, lines 3-9. It is respectfully submitted that if Healy contemplated "exposed areas" the solder in Figure 4 would not act as described. Rather, the solder would tend to spread horizontally when heated. As such, it is respectfully submitted that, as shown in Figure 5, Healy's structure includes insulative material that covers the trace and trace remnant so that when the solder is melted, it climbs vertically between the spacer and pin to bond parallel surfaces.

The Examiner improperly cites prior art of record, but not relied on to make the rejections, to conclude how one of ordinary skill in the art would construe Figures 1 and 4 of Healy. Specifically, the Examiner, without any explanation, generically states that the illustrations shown in Abe, Schueller and Natarajan et al. are better and show where parts of the trace are exposed. From this, the Examiner concludes without any supporting logic that Healy shows the same thing in his Figures. It is respectfully submitted that Healy clearly states that his "exposed area" is no greater than the interconnect pad. Thus, the trace is not exposed. Accordingly, reliance upon other art has no bearing on what Healy has specifically disclosed. Moreover, the Examiner's reliance on other art with "better pictures" without more is improper and constitutes a new ground of rejection. Appellant has addressed this issue in a Petition to the

Supervisory Patent Examiner. However, there was no decision on the petition by the time this Reply Brief was due.

The Examiner seems to believe that the independent claims must affirmatively recite exposure of the trace and trace stub or element for the claimed forces to exist. Not so. The independent claims do not call for an insulation type material to cover a portion of the trace and/or the trace stub or trace element. Thus, there is no need for the independent claims to affirmatively state that a portion of the trace is exposed. Without a limitation so stating, the trace and trace stub are exposed. Thus, there is no other feature that is required to provide the attractive force to solder placed on the bond pad. Because Healy does cover his trace and trace remnant with insulation, for the claims to be anticipated there must be some indication that an attractive force and a counteractive attractive force are applied to the solder placed on the interconnect pad 4. Because Healy only removes that portion of the insulation material directly over the pad 4, no force is applied to the solder. Accordingly, Healy does not anticipate the claims.

Regarding dependent claim 3, the bond pad is a non-solder mask defined pad. In contrast, Healy discloses that only the insulation material over the pad is removed. See Column 2, lines 18-24. Thus, Healy discloses a solder-mask defined pad. Accordingly, there is no void around the pad as suggested by the Examiner. Rather, the perimeter of the void area is the same as or less than the perimeter of the pad. Moreover, because Figure 1 is a fragmentary view, there is no support for the argument that the insulation does not define the void area. The fact is Healy did not contemplate removing insulation to expose more than the pad itself. Accordingly, Healy does not anticipate claim 3.

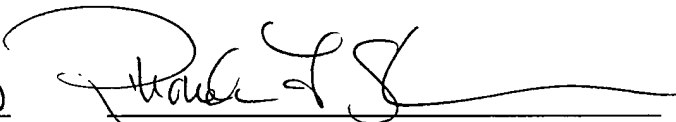
Regarding dependent claim 14, a solder mask defines a solder mask opening around the bond pad; the element extends from the bond pad and through the opening. In contrast, Healy does not have an opening around the pad so that the trace remnant extends from the bond pad through an opening. As explained above, the void area cleared by Healy only exposes the pad. Thus, the void does not surround the pad in a way that allows the trace to extend through the void. Therefore, because Healy clearly defines the outer boundary of his opening, void or exposed area, any other interpretation goes against his express teaching.

For the reasons explained above, the Appellant respectfully requests that the Examiner's rejection of the claims be reversed and the application be passed to issue.

Respectfully submitted,

Date:

July 17, 2002


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